AFCTN Test Report 94-064

AFCTB-ID 94-022

Technical Graphics Transfer

Using:

Sikorsky Aircraft's Data

For The Army Blackhawk Program

(Contract #DAAJ09-92-C-0004)

MIL-D-28003 (CGM)

Quick Short Test Report

22 March 1994

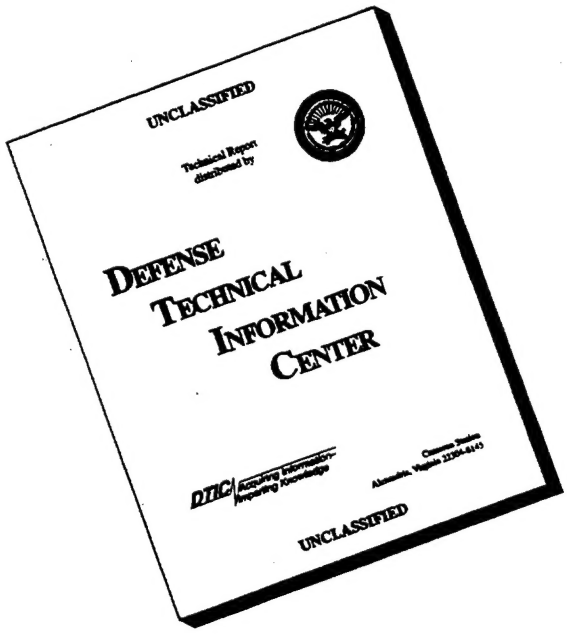
19960822 063

Prepared For
Electronic Systems Center
Det 2 HQ ESC/AV-2
4027 Colonel Glenn Hwy, Suite 300
Dayton, Ohio 45431-1672

DTIC QUALITY INSPECTED 3

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

DISCLAIMER NOTICE



THIS DOCUMENT IS BEST QUALITY AVAILABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

Technical Graphics Transfer Using: Sikorsky Aircraft's Data: For The Army Blackhawk Program

(Contract #DAAJ09-92-C-0004)

MIL-D-28003 (CGM)

Quick Short Test Report

22 March 1994

Prepared By
Air Force CALS Test Bed
Wright-Patterson AFB, OH 45433

AFCTB Contact
Gary Lammers
(513) 427-2295

AFCTN Contact
Mel Lammers
(513) 427-2295

DTIC QUALITY INSPECTED 3

DISCLAIMER

This document was prepared as an account of the work sponsored by the Air Force. Neither the United States Government, the Air Force, nor any of their employees makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, nor represents that its use would not infringe on privately owned rights. Reference herein to any specific commercial products, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or the Air Force. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or the Air Force, and shall not be used for advertising or product endorsement purposes.

Available to the public from the
National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161

This report and those involved in its preparation do not endorse any product, process, or company stated herein. Use of these means by anyone does not imply certification by the Air Force CALS Test Network (AFCTN).

Air Force CALS Test Bed

Notification of Test Results

22 March 1994

This notice documents the results of an Air Force CALS Test Bed (AFCTB) Quick Short Test Report (QSTR) evaluation of data submitted by:

Sikorsky Aircraft

Identified as follows:

Title:	**Technical Graphics Transfer**
Program:	**BLACKHAWK**
Program Office:	**U. S. Army**
Contract No.:	**DAAJ09-92-C-0004**
QSTR No.:	**AFCTB-ID 94-022**

Received on the following media: **Electronic Transfer via the BBS**

The results of the AFCTB Quick Short Test evaluation are as follows:

MIL-STD-1840A Media Format:	**N/A**
MIL-D-28000A IGES:	**N/A**
MIL-M-28001A SGML:	**N/A**
MIL-R-28002A Raster:	**N/A**
MIL-D-28003 CGM:	**#1 Pass, #2 Fail, #3 Fail**

Formal results with associated disclaimer are documented and available from the AFCTB.

Air Force CALS Test Bed
HQ ESC/AV-2P
4027 Colonel Glenn Highway, Suite 300
Dayton, OH 45431-1672
Phone: 513-257-3085 FAX: 513-257-5881

Contents

1. Introduction.....1

1.1. Background.....1

1.2. Purpose.....2

2. Test Parameters.....3

3. 1840A Analysis.....5

3.1. External Packaging.....5

3.2. Transmission Envelope.....5

3.2.1. Tape Formats.....5

3.2.2. Declaration and Header Fields.....5

4. IGES Analysis.....5

5. SGML Analysis.....5

6. Raster Analysis.....6

7. CGM Analysis.....6

8. Conclusions and Recommendations.....9

9. Appendix A - Detailed CGM Analysis.....10

9.1. File SIKTEST1.....10

9.1.1. Parser Log MetaCheck.....10

9.1.2. validcgm Log.....11

9.1.3. Designer 4.0 Log File.....12

9.1.4. Output CADLeaf.....13

9.1.5. Output CALSView.....14

9.1.6. Output Generic.....15

9.1.7. Output Designer.....16
9.1.8. Output Freelance.....17
9.1.9. Output Harvard Graphics.....18
9.1.10. Output HiJaak Pro.....19
9.1.11. Output IslandDraw.....20
9.1.12. Output IslandDraw 4.0.....21
9.1.13. Output Ventura Publisher.....22
9.1.14. Output X-Change.....23
9.2. File SIKTEST3.....24
9.2.1. Parser Log MetaCheck.....24
9.2.2. validcgm Log.....25
9.2.3. Designer 4.0 Log File.....26
9.2.4. Output CADLeaf.....27
9.2.5. Output CALSView.....28
9.2.6. Output Generic.....29
9.2.7. Output Designer.....30
9.2.8. Output Freelance.....31
9.2.9. Output Harvard Graphics.....32
9.2.10. Output HiJaak Pro.....33
9.2.11. Output IslandDraw.....34
9.2.12. Output IslandDraw 4.0.....35
9.2.13. Output Ventura Publisher.....36
9.2.14. Output X-Change.....37

1. Introduction

1.1 Background

The Department of Defense (DoD) Air Force Continuous Acquisition and Life-cycle Support (CALS) Test Network (AFCTN) is conducting tests of the military standard for the Automated Interchange of Technical Information, MIL-STD-1840A, and its companion suite of military specifications. The AFCTN is a DoD sponsored confederation of voluntary participants from industry and government managed by the Electronic Systems Center (ESC).

The primary objective of the AFCTN is to evaluate the effectiveness of the CALS standards for technical data interchange and to demonstrate the technical capabilities and operational suitability of those standards. Two general categories of tests are performed to evaluate the standards; formal and informal.

Formal tests are large and comprehensive, which follow a written test plan, require specific authorization from the DoD, and may take months to prepare, execute, and report.

Informal tests are quick and short, used by the AFCTN technical staff, to broaden the testing base. They include representative samples of the many systems and applications used by AFCTN participants. They also allow the AFCTN staff to gain feedback from many industry and government interpretations of the standards, to increase the base of participation in the CALS initiative, and respond to the many requests for help that come from participants. Participants take part voluntarily, benefit by receiving an evaluation of their latest implementation (interpretation) of the standards, interact with the AFCTN technical staff, gain experience using the standards, and develop increased confidence in them. The results of informal tests are reported in Quick Short Test Reports (QSTRs) that briefly summarize the standard(s) tested, the hardware and software used, the nature of the test, and the results.

1.2 Purpose

The purpose of the informal test, reported in this QSTR, was to analyze Sikorsky Aircraft's interpretation and use of the CALS standards in transferring technical graphics data. Sikorsky used its CALS Technical Data Interchange System to produce data, in accordance with the standards, and delivered it to the AFCTN technical staff using an electronic transfer media.

The stated purpose of the evaluation was to test the CGM files and not the CALS headers.

2. Test Parameters

Test Plan: AFCTB 94-022

Date of Evaluation: 22 March 1994

Evaluator:
George Elwood
Air Force CALS Test Bed
DET 2 HQ ESC/AV-2P
4027 Colonel Glenn Hwy
Suite 300
Dayton OH 45431-1672

Data Originator:
Frank Krasnicki
Sikorsky Aircraft
6900 Main Street
M/S B205A
P. O. Box 9729
Stratford CT 06497-9129
(203) 384-7068

Data Description: Technical Graphics Test
3 Computer Graphics Metafile (CGM) files

Data Source System:

CGM

HARDWARE
Auto-trol Apollo DN3550 Graphics Workstations
Auto-trol Apollo DSP 4500 Servers

SOFTWARE
Auto-trol Tech Illustrator Plus 8.2.6
Auto-trol S5K/IGES Processor 6.0
Auto-trol S5K/CGM Converter 1.4
Auto-trol S5K/DXF AutoCad Converter 3.0

Evaluation Tools Used:

MIL-D-28003 (CGM)

HP 735
- InterCAP *X-Change v7.82*

SGI Indigo 2
- IGES Data Analysis (IDA) *CALSView*

SUN SparcStation 2
- Carberry *CADLeaf Plus v3.1*
- Island Graphics *IslandDraw v3.0*
- Island Graphics *IslandDraw v4.0*

PC 486/50
- Advanced Technology Center (ATC) *MetaCheck R 2.10*
- Software Publishing Corporation (SPC) *Harvard Graphics v3.05*
- Inset Systems *HiJaak Pro*
- Lotus *Freelance v2.01*
- Micrografx *Designer v4.0*
- Corel *Ventura Publisher*

Standards Tested:

MIL-D-28003

3. 1840A Analysis

3.1 External Packaging

The files arrived at the Air Force CALS Test Bed (AFCTB) via an electronic transfer to the Bulletin Board server. No physical media was exchanged or evaluated.

3.2 Transmission Envelope

The files received by the AFCTB were not MIL-STD-1840A, and were not named per the standard conventions. The stated purpose of the evaluation was the basic data structure.

3.2.1 Tape Formats

No tape was submitted for evaluation.

3.2.2 Declaration and Header Fields

The files were submitted for evaluation without the CALS headers or Document Declaration file. The purpose of the evaluation was to test the basic data files only.

4. IGES Analysis

No Initial Graphics Exchange Specification (IGES) files were included in this evaluation.

5. SGML Analysis

No Standard Generalized Markup Language (SGML) files were included in this evaluation.

6. Raster Analysis

No Raster files were included in this evaluation.

7. CGM Analysis

The transfer consisted of three CGM files. The AFCTB has several tools for viewing CGM files. These tools are not used to generate a pass/fail but to report how commercially available software can handle the files. Many of these products are used in the development of technical publications and are good indicators of usability. The use of these products is not an endorsement nor and indication of CALS capability. All operations were performed using the default settings.

The files were evaluated using ATC's *MetaCheck* with CALS options. File SIKTEST1.CGM was reported as meeting the CALS MIL-D-28003 specification. File SIKTEST2.CGM was bad and no report was generated. File SIKTEST3.CGM reported errors with the fonts. The last two files did not meet the CALS MIL-D-28003 specification.

The CGM files were evaluated using the beta AFCTN *validcgm* utility. File SIKTEST1.CGM reported no errors. File SIKTEST2.CGM was a bad file. File SIKTEST3.CGM reported illegal fonts. The fonts in the file were reported as:

```
"HELVETICA"
"HELVETICA_BOLD"
"HELVETICA_BOLD"
```

while MIL-D-28003, para. 3.2.5, Table VI lists 16 HERSHEY fonts.

The files were read into Carberry's *CADLeaf* software and displayed. File SIK2 was reported as not being a CGM file. The other two files were imported without a reported error. Some text overflow was noted in both files.

The files were read into IDA's *CALSView*. File SIK2 was reported as not being a valid file. Text overlap was noted in both files SIK1 and SIK3.

The files were viewed using another software available within the AFCTB. Nothing was displayed for file SIK2. Both files SIK1 and SIK3 had random lines from a point. Text overlap was noted in both files.

The files were imported into the Micrografx *Designer* with file SIK2 being reported as an invalid file. File SIK1 had four reported warnings, and file SIK3 had 16 reported warnings. The circles with text inserted displayed and printed as total black circles, in file SIK1. No text overlap was noted. The circles and square blocks, in file SIK3, had a white background inserted to permit the text to be viewed. No text overlap was noted in SIK3.

According to Michael Harrison of Micrografx, "The version of Micrografx Designer used with this report has beenreplaced with Designer version 4.1TE which reads and prints these files successfully."

The files were imported into Lotus' *Freelance* and displayed. File SIK2 was reported as an invalid file. The circles and squares in both files SIK1 and SIK3 were displayed and printed in black. Some text overlap was noted, and the text font was different between both files.

The files were imported into SPC's *Harvard Graphics v3.05* with a reported error for file SIK2. The circles and squares displayed and printed in black. Some text overlap was noted.

The files were read into Inset Systems' *HiJaak Pro* with a reported error for file SIK2. The circles and squares displayed and printed in black. Some text overlap was noted in both files.

The CGM files were converted using another utility, available within the AFCTB, with a reported error for file SIK2. The resulting files were read into Island Graphics' *IslandDraw v3.1*, displayed and printed. The circles and squares displayed and printed without a problem. Some text overlap, and the different fonts were noted in the two files.

The files were imported directly into Island Graphics' *IslandDraw v4.0* with a reported error for file SIK2. The circles and squares displayed and printed correctly except the text inside these entities was not visible. No text overlap was noted.

The files were imported into Corel's *Ventura Publisher* with a reported error for file SIK2. The circles and squares displayed and printed correctly. The text size in the circles was very small and unreadable. No text overlap was noted on either file.

The files were read into InterCAP's *X-Change* with a reported error for file SIK2. The circles and squares displayed and printed correctly. However, the text within these entities exceeded the boundaries. Text overlap was noted in both files.

Of the three CGM files, sent to the AFCTB, only the first file meets the CALS MIL-D-28003 specification. The second file was bad and could not be read by any of the applications available within the AFCTB. The third file had CALS font errors. Most applications had problems with the circle and square entities. They were printed in black making the text located within these areas impossible to read.

8. Conclusions and Recommendations

Sikorsky Aircraft sent three files to the AFCTB for data evaluation. The CALS MIL-STD-1840A was not to be tested. Of the three CGM files, the first one meets the CALS MIL-D-28003 specification. The second file transmitted was bad, and the third file had font errors. These two files do not meet the CALS MIL-D-28003 specification.

9. Appendix A - Detailed CGM Analysis

9.1 File SIKTEST1

9.1.1 Parser Log MetaCheck

```
MetaCheck Version 2.10 -- CGM/MIL-D-28003 Conformance Analyzer
Copyright 1988-93 CGM Technology Software
Execution Date: 03/22/94     Time:  15:48:40

Metafile Examined    : i:\94022\siktest1.cgm

Pictures Examined    : All
Elements Examined    : All
Bytes    Examined    : All

======================== Trace Report ========================

Tracing not selected.

============= CGM Conformance Violation Report ==============

No Errors Detected

========== CALS CGM Profile (MIL-D-28003) Report ============

No profile discrepancies detected.

================ Conformance Summary Report =================

MetaCheck Version 2.10 -- CGM/MIL-D-28003 Conformance Analyzer
Copyright 1988-93 CGM Technology Software
Execution Date: 03/22/94     Time:  15:48:43

Name of CGM under test: i:\94022\siktest1.cgm
Encoding              : Binary

Pictures Examined    : All
Elements Examined    : All
Bytes    Examined    : All

BEGIN METAFILE string : >cals1<
METAFILE DESCRIPTION  : >AUTO-TROL/REL-1.0 MIL-D-28003/BASIC-<
                        >1<
```

```
Picture 1 starts at octet offset 152: >cals1<

Conformance Summary  :  This file conforms to the CGM specification.
                        This file meets the CALS CGM Profile (MIL-D-28003).

Summary of Testing Performed and Errors Found:

          1 Pictures Tested
        796 Elements Tested
       8234 Octets Tested

              ================================
              |    No Errors Were Detected    |
              ================================

================ End of Conformance Report ==================
```

9.1.2 validcgm Log

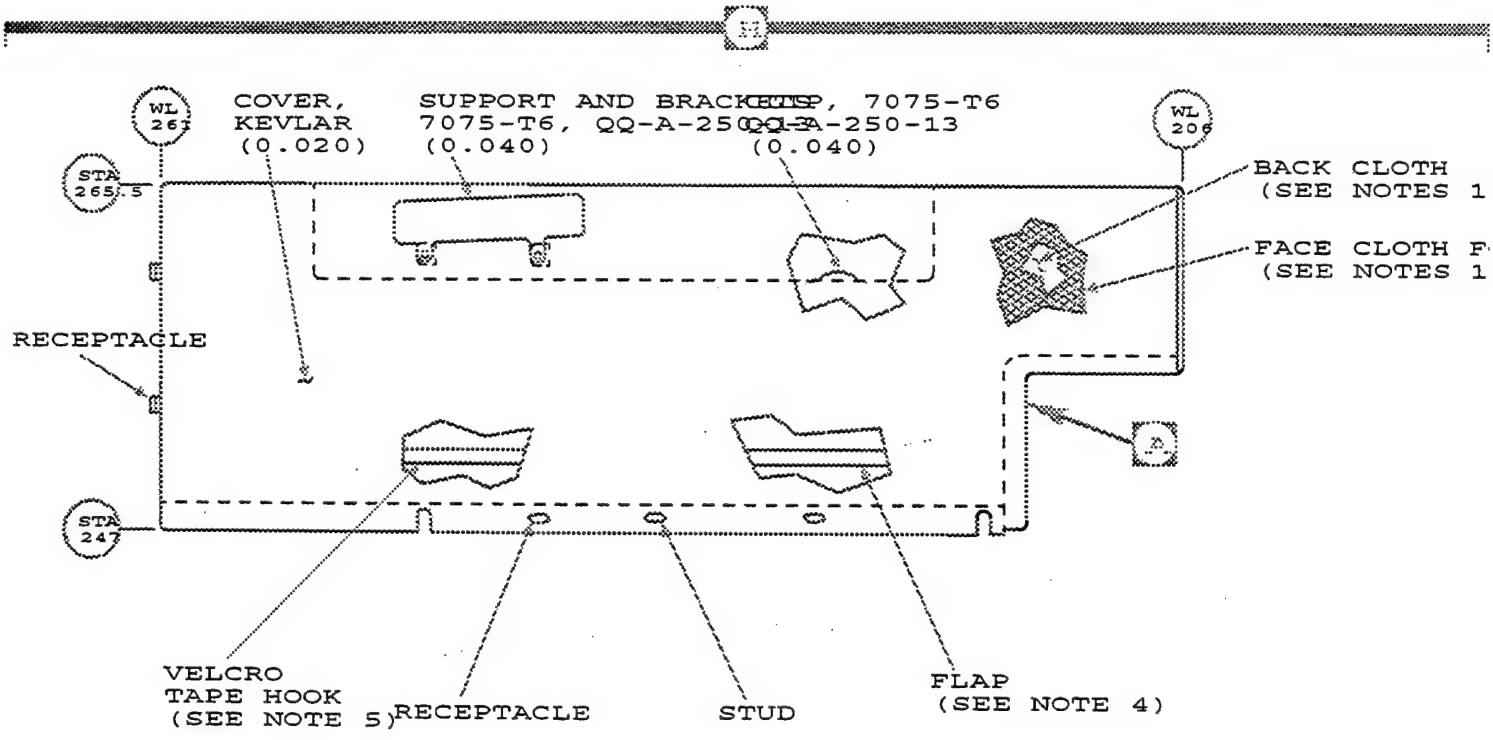
```
Analysis for file siktest1.cgm using table table
(0, 1) occurred 1 time
(0, 2) occurred 1 time
(0, 3) occurred 1 time
(0, 4) occurred 1 time
(0, 5) occurred 1 time
(1, 1) occurred 1 time
(1, 2) occurred 1 time
(1, 5) occurred 1 time
(1, 7) occurred 1 time
(1, 8) occurred 1 time
(1, 9) occurred 1 time
(1, 11) occurred 1 time
(1, 13) occurred 1 time
(2, 1) occurred 1 time
(2, 3) occurred 1 time
(2, 4) occurred 1 time
(2, 5) occurred 1 time
(2, 6) occurred 1 time
(2, 7) occurred 1 time
(4, 1) occurred 149 times
(4, 4) occurred 35 times
(4, 7) occurred 137 times
(4, 12) occurred 10 times
(4, 15) occurred 25 times
(4, 17) occurred 3 times
(5, 3) occurred 9 times
```

```
(5, 4) occurred 7 times
(5, 10) occurred 3 times
(5, 13) occurred 2 times
(5, 14) occurred 3 times
(5, 15) occurred 7 times
(5, 16) occurred 1 time
(5, 18) occurred 1 time
(5, 22) occurred 18 times
(5, 23) occurred 22 times
(5, 28) occurred 14 times
(5, 29) occurred 21 times
(5, 30) occurred 275 times
(5, 34) occurred 35 times
```

9.1.3 Designer 4.0 Log File

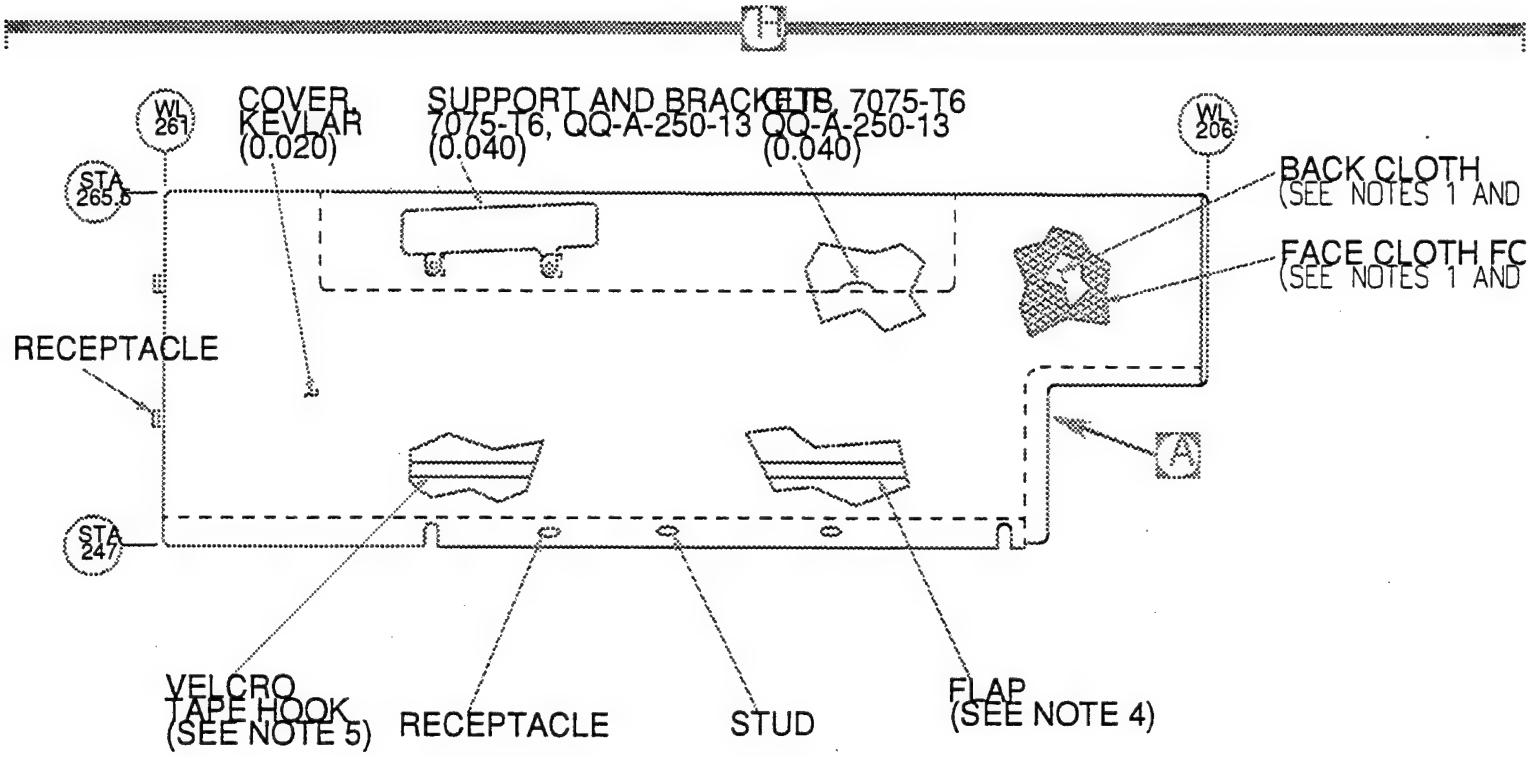
```
Computer Graphics Metafile from I:\94022\SIKTEST1.CGM
Import started on 03/23/1994 at 09:58

Input Translator Warning #103:
  Unrecognized data in input data stream.
Input Translator Warning #103:
  Unrecognized data in input data stream.
Input Translator Warning #103:
  Unrecognized data in input data stream.
Input Translator Warning #103:
  Unrecognized data in input data stream.

Computer Graphics Metafile from I:\94022\SIKTEST1.CGM
Import completed on 03/23/1994 at 09:58
```

9.1.4 Output CADLeaf



VIEW RH
LOOKING OUTBOARD

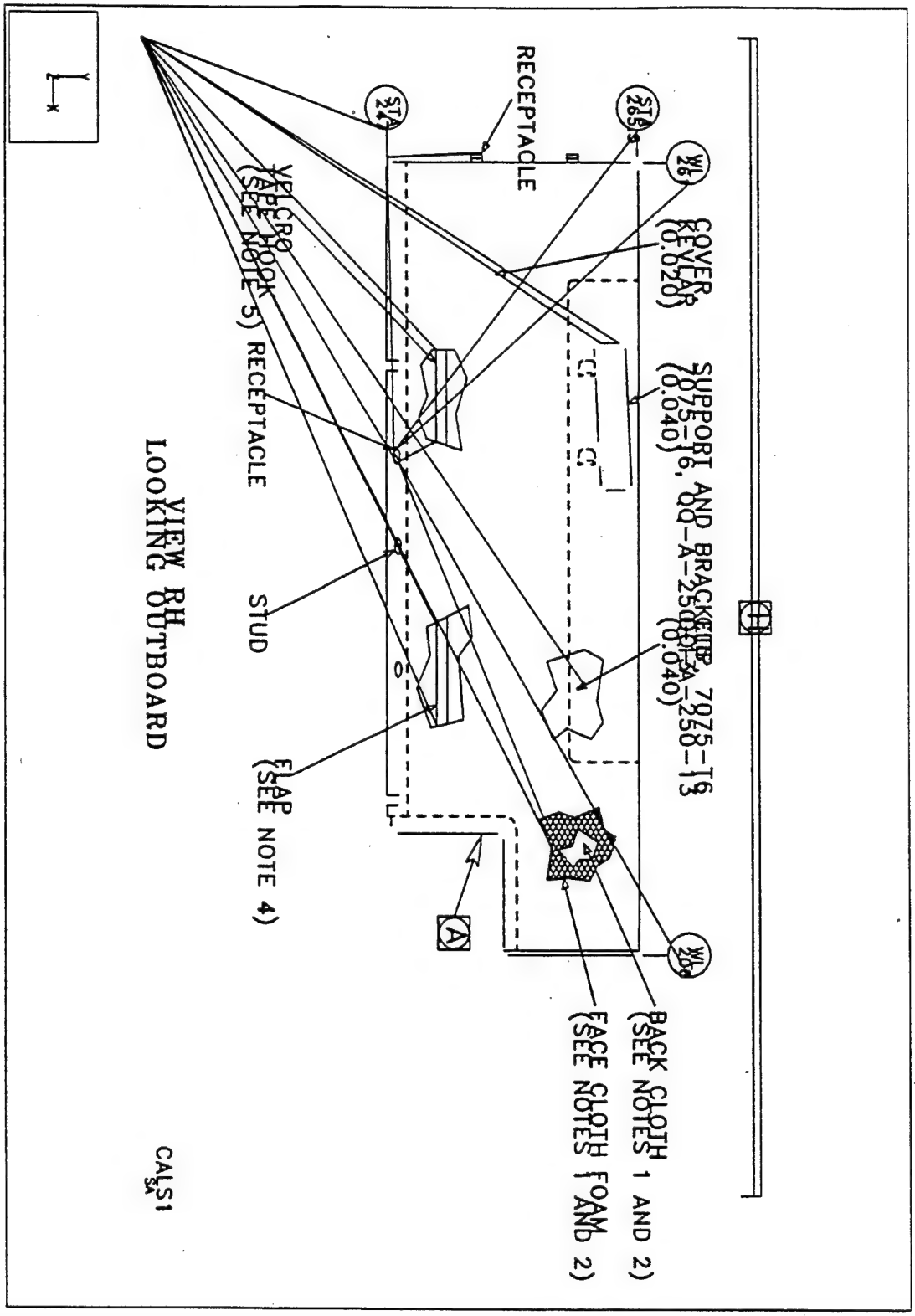
9.1.5 Output CALSView



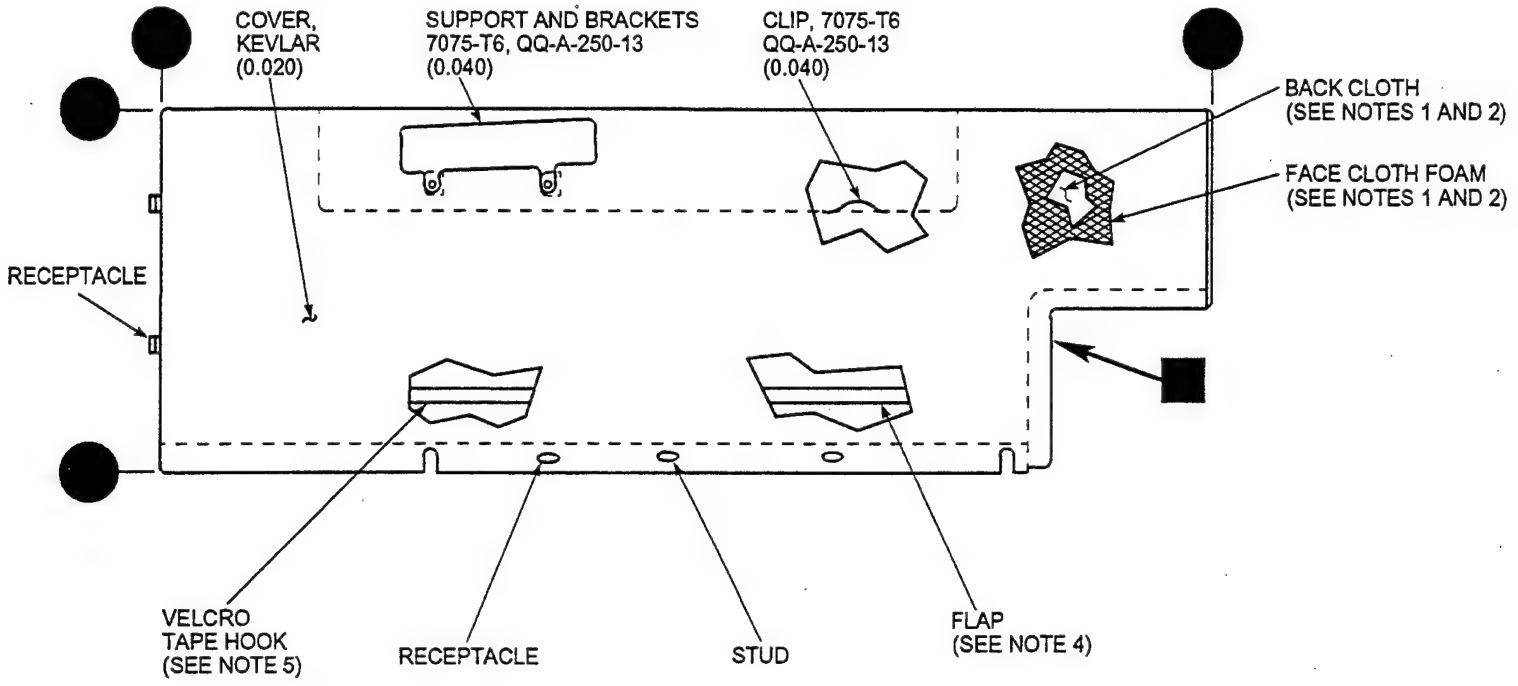
VIEW RH
LOOKING OUTBOARD

CALS SA

9.1.6 Output Generic



9.1.7 Output Designer



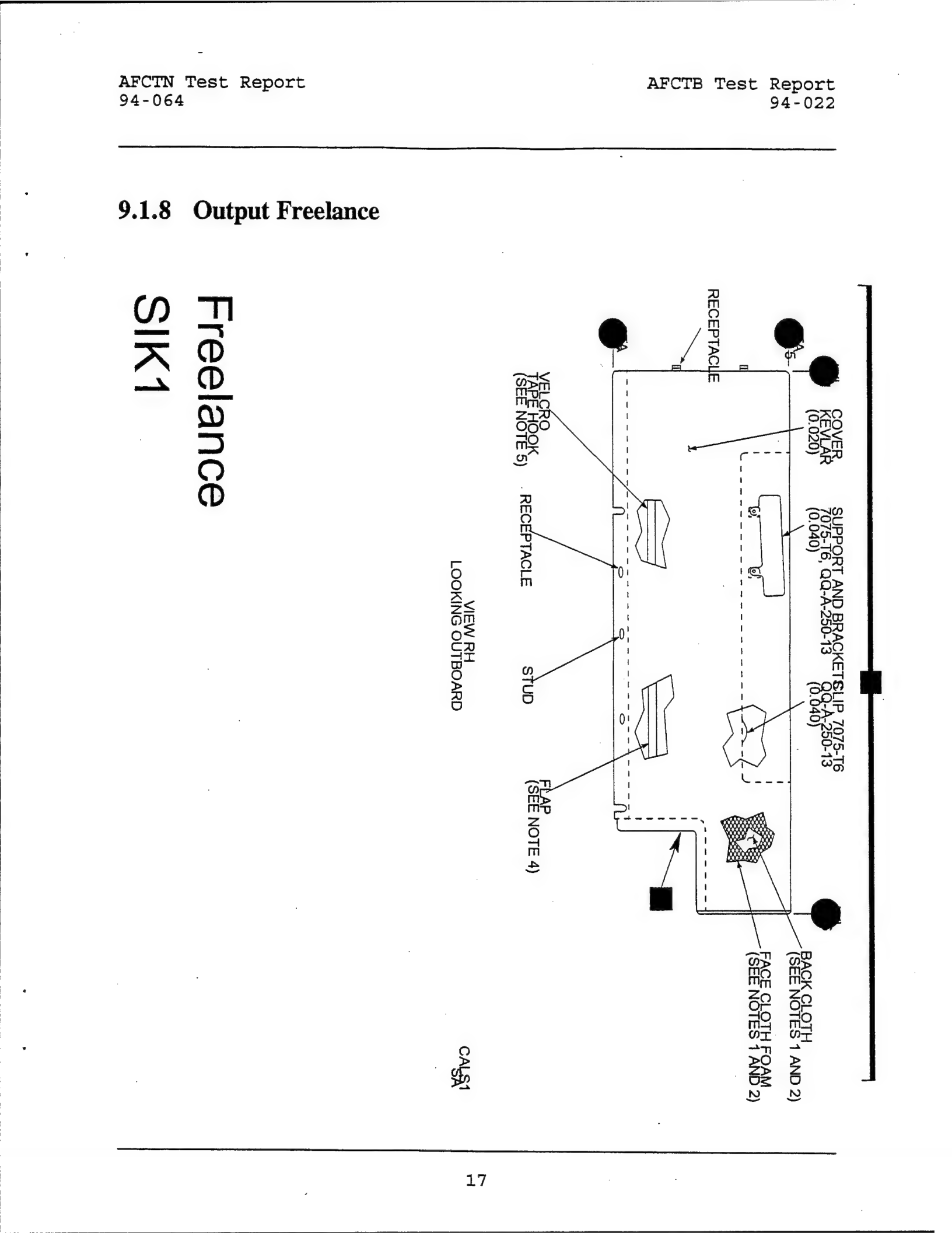
VIEW RH
LOOKING OUTBOARD

CALS

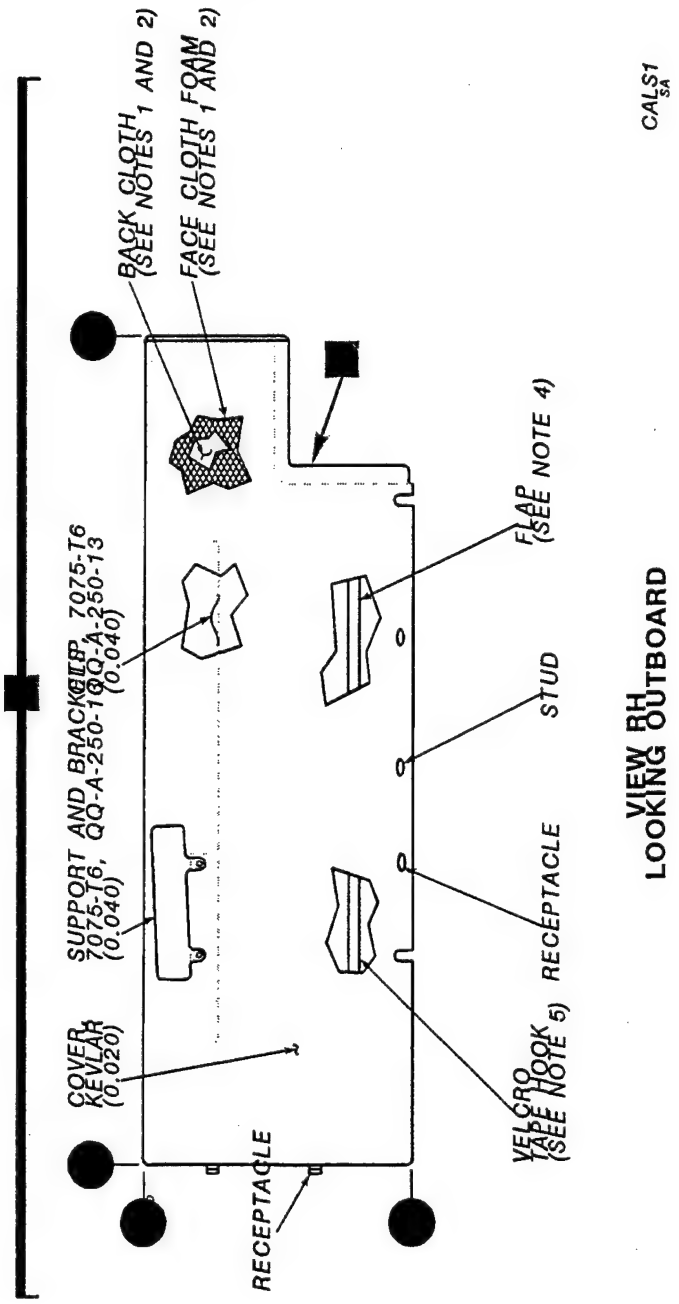
Designer

4.0

9.1.8 Output Freelance

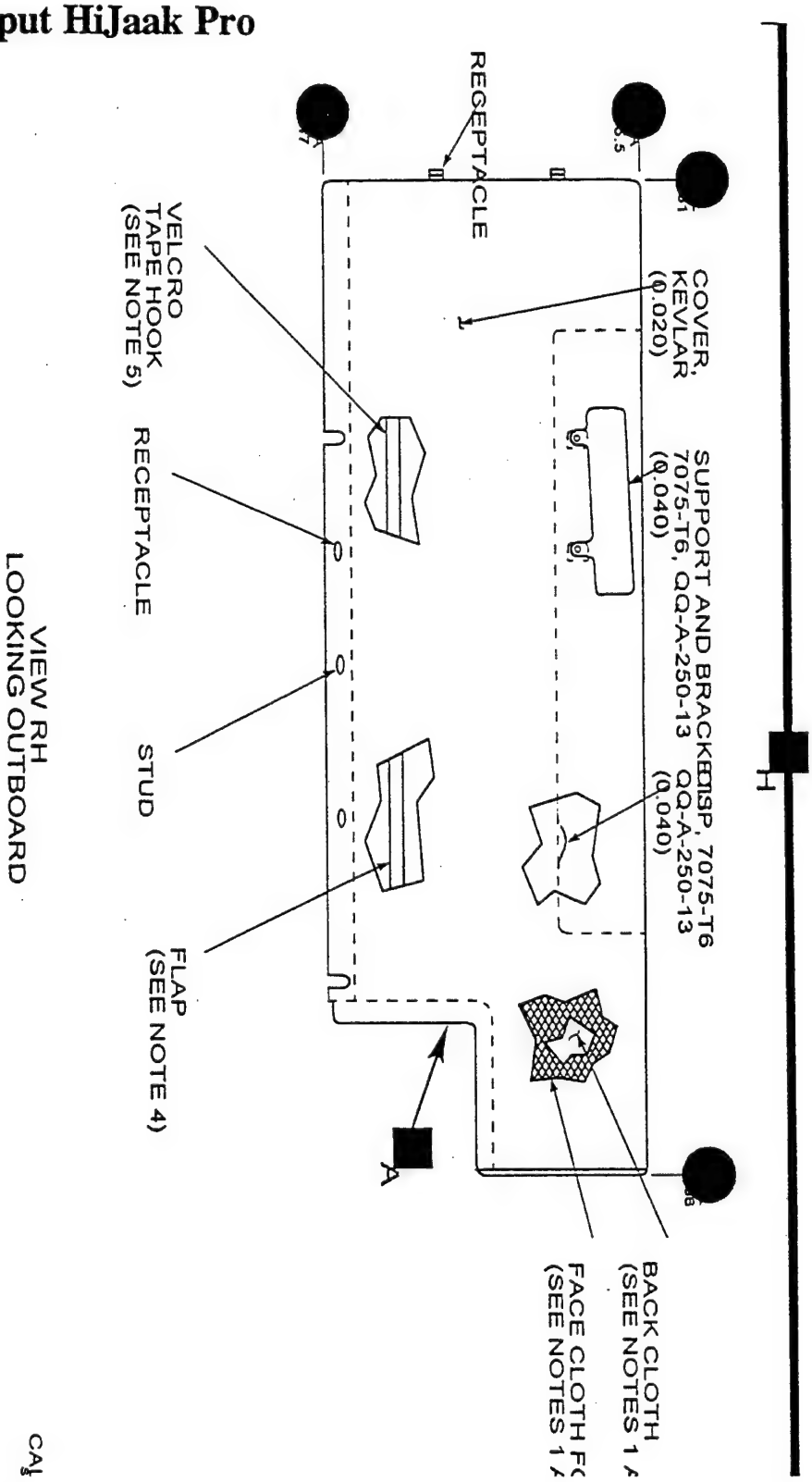


9.1.9 Output Harvard Graphics

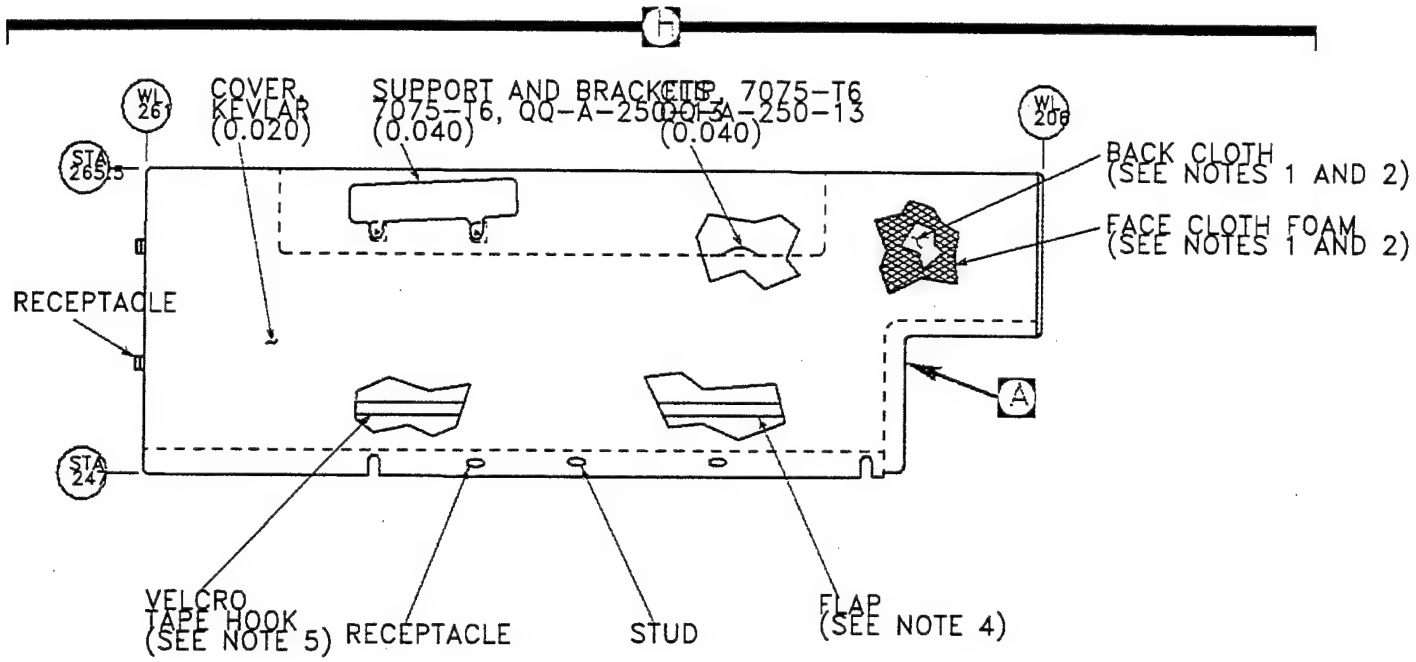


HG305
ski 1

9.1.10 Output HiJaak Pro



9.1.11 Output IslandDraw

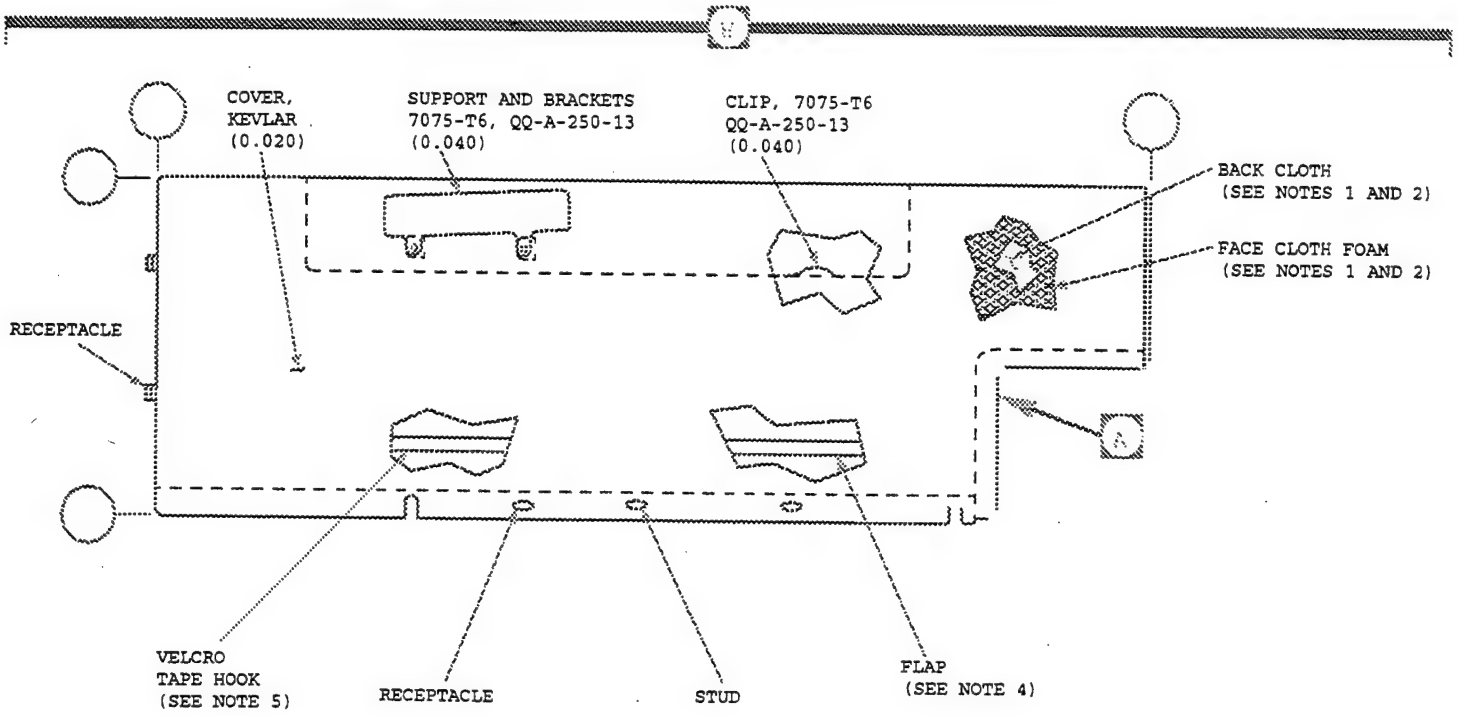


VIEW RH
LOOKING OUTBOARD

CALS1
SA

C2D/ID
SIK1

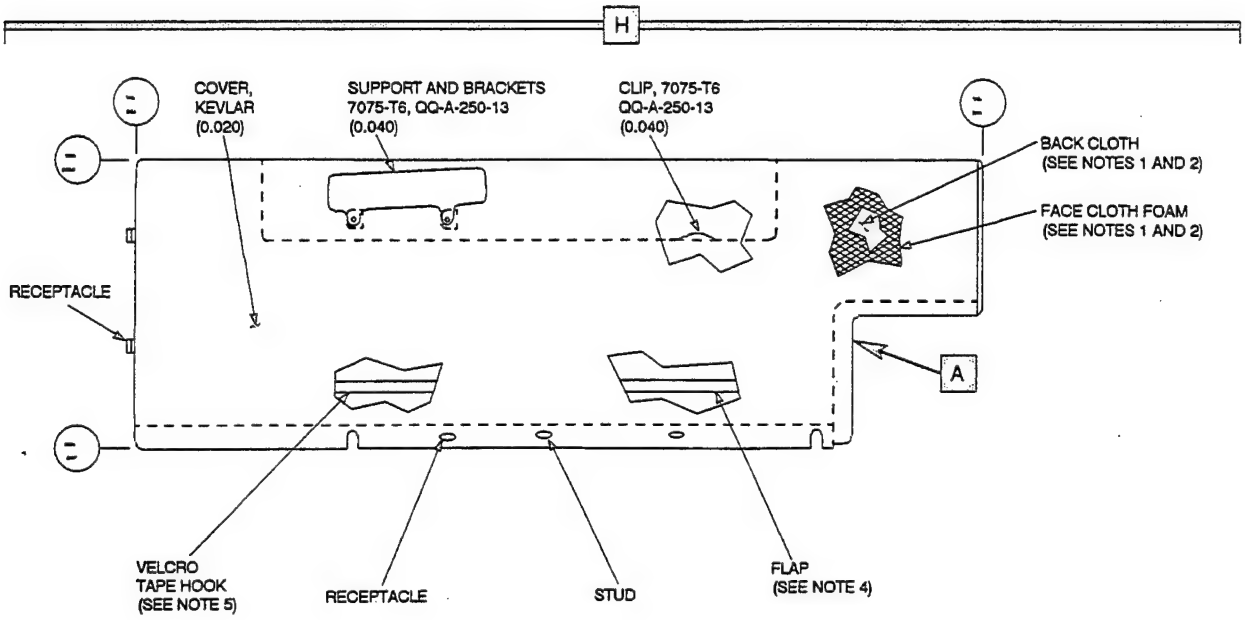
9.1.12 Output IslandDraw 4.0



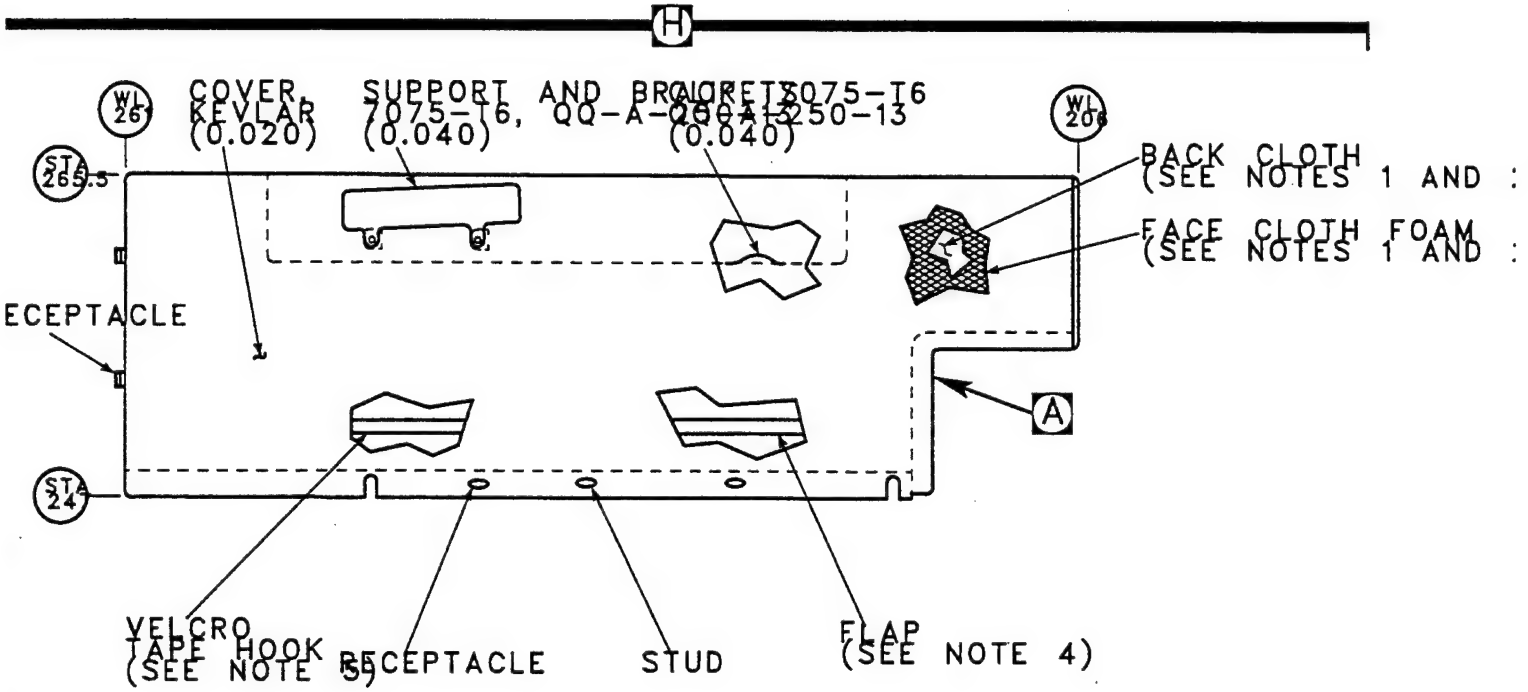
VIEW RH
LOOKING OUTBOARD

ID 4.0
SIK1

9.1.13 Output Ventura Publisher



9.1.14 Output X-Change



VIEW RH
LOOKING OUTBOARD

CALS1
SA

9.2 File SIKTEST3

9.2.1 Parser Log MetaCheck

```
MetaCheck Version 2.10 -- CGM/MIL-D-28003 Conformance Analyzer
Copyright 1988-93 CGM Technology Software
Execution Date: 03/22/94     Time:  15:49:10

Metafile Examined    : i:\94022\siktest3.cgm
Pictures Examined    : All
Elements Examined    : All
Bytes    Examined    : All

======================== Trace Report ========================

Tracing not selected.

============= CGM Conformance Violation Report ==============

No Errors Detected

========== CALS CGM Profile (MIL-D-28003) Report ============

Error 6509: Element Class/ID: 1/13   Offset: 82 octets Element No. 9
Invalid list parameters; each of the Font Names in the FONT LIST element
must be among the Font Names allowed by the Profile.

================ Conformance Summary Report =================

MetaCheck Version 2.10 -- CGM/MIL-D-28003 Conformance Analyzer
Copyright 1988-93 CGM Technology Software
Execution Date: 03/22/94     Time:  15:49:14

Name of CGM under test: i:\94022\siktest3.cgm
Encoding              : Binary
Pictures Examined     : All
Elements Examined     : All
Bytes    Examined     : All

BEGIN METAFILE string : >cals3<
METAFILE DESCRIPTION  : >AUTO-TROL/REL-1.0 MIL-D-28003/BASIC-<
                        >1<

Picture 1 starts at octet offset 126: >cals3<
Conformance Summary   :  This file conforms to the CGM specification.
                         However, this file does not satisfy
```

```
                    the CALS CGM Profile (MIL-D-28003).

Summary of Testing Performed and Errors Found:

          1 Pictures Tested
       1108 Elements Tested
      13012 Octets Tested

        0 Illegal CGM Elements                          1000 -   1999
        0 Incorrect CGM Element Lengths                 2000 -   2999
        0 CGM State Errors                              3000 -   3499
        0 Required CGM Elements Missing or Wrong        4000 -   4499
        0 CGM Parameter Values Out of Range             6000 -   6499
        0 CGM Structure Errors                          7000 -   7499
        0     ***     CGM Errors Found (total)      ***

        0 Profile State Errors                          3500 -   3999
        0 Illegal Profile Elements                      4500 -   4999
        1 Profile Parameter Values Out of Range         6500 -   6999
        0 Profile Data Limits Exceeded                  8500 -   8999
        0 Other Profile Constraints Violated            9500 -   9999
        1     *** Profile Violations Found (total) ***

        1 distinct error(s) and warning(s) reported.

================ End of Conformance Report ==================
```

9.2.2 validcgm Log

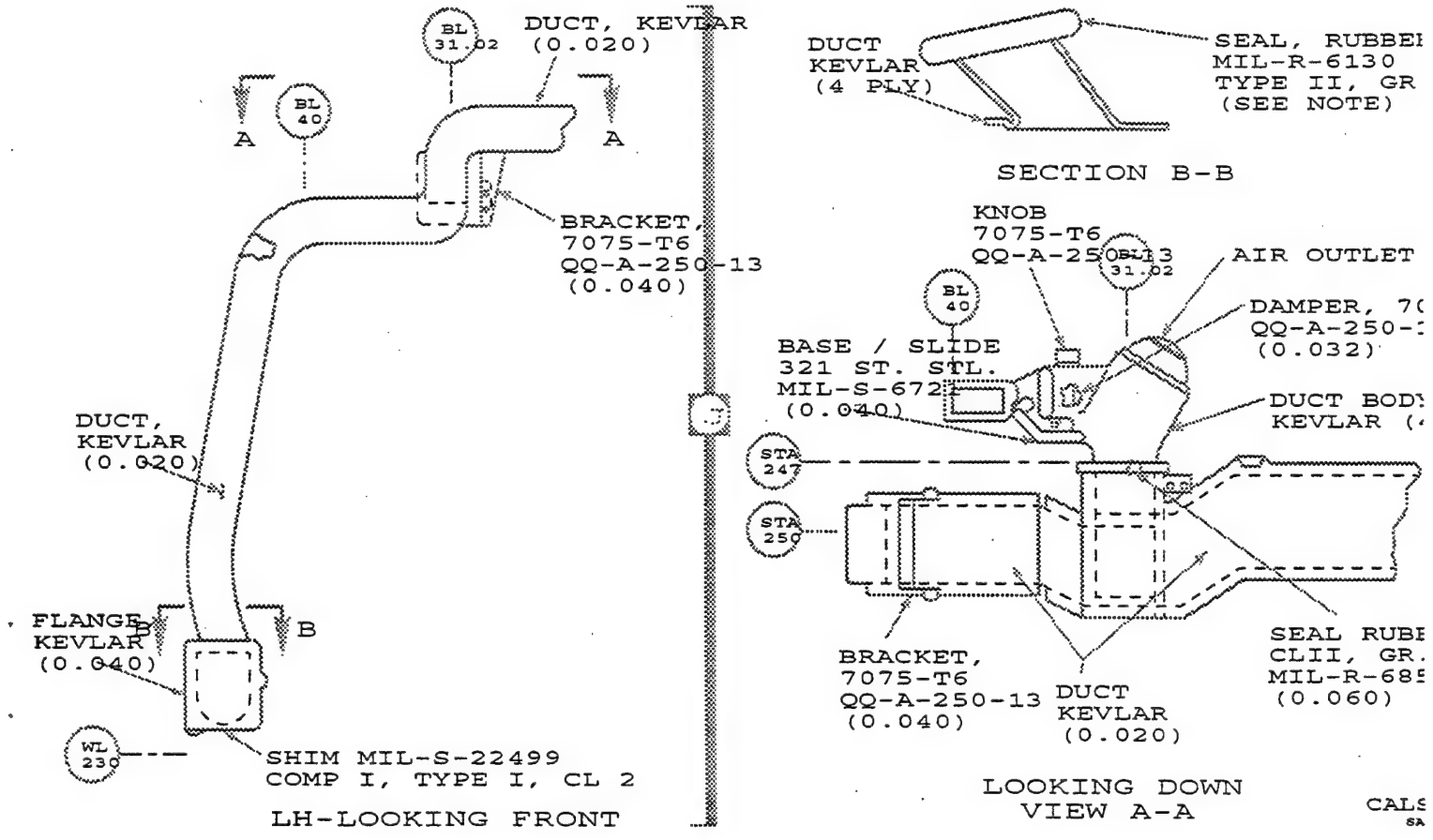
```
Analysis for file siktest3.cgm using table table
MILSPEC 28003 error: illegal font name  HELVETICA
MILSPEC 28003 error: illegal font name  HELVETICA_BOLD
MILSPEC 28003 error: illegal font name  HELVETICA_BOLD
(9, 82)          (1, 13, 40)    Font List
                                "HELVETICA"
                                "HELVETICA_BOLD"
                                "HELVETICA_BOLD"

(0, 1) occurred 1 time
(0, 2) occurred 1 time
(0, 3) occurred 1 time
(0, 4) occurred 1 time
(0, 5) occurred 1 time
(1, 1) occurred 1 time
(1, 2) occurred 1 time
(1, 5) occurred 1 time
(1, 7) occurred 1 time
```

```
(1, 8) occurred 1 time
(1, 9) occurred 1 time
(1, 11) occurred 1 time
(1, 13) occurred 1 time
(2, 1) occurred 1 time
(2, 3) occurred 1 time
(2, 4) occurred 1 time
(2, 5) occurred 1 time
(2, 6) occurred 1 time
(2, 7) occurred 1 time
(4, 1) occurred 162 times
(4, 4) occurred 70 times
(4, 7) occurred 194 times
(4, 12) occurred 18 times
(4, 15) occurred 34 times
(5, 3) occurred 20 times
(5, 4) occurred 7 times
(5, 10) occurred 3 times
(5, 13) occurred 8 times
(5, 14) occurred 2 times
(5, 15) occurred 14 times
(5, 16) occurred 3 times
(5, 18) occurred 1 time
(5, 22) occurred 35 times
(5, 23) occurred 39 times
(5, 28) occurred 21 times
(5, 29) occurred 34 times
(5, 30) occurred 389 times
(5, 34) occurred 35 times
```

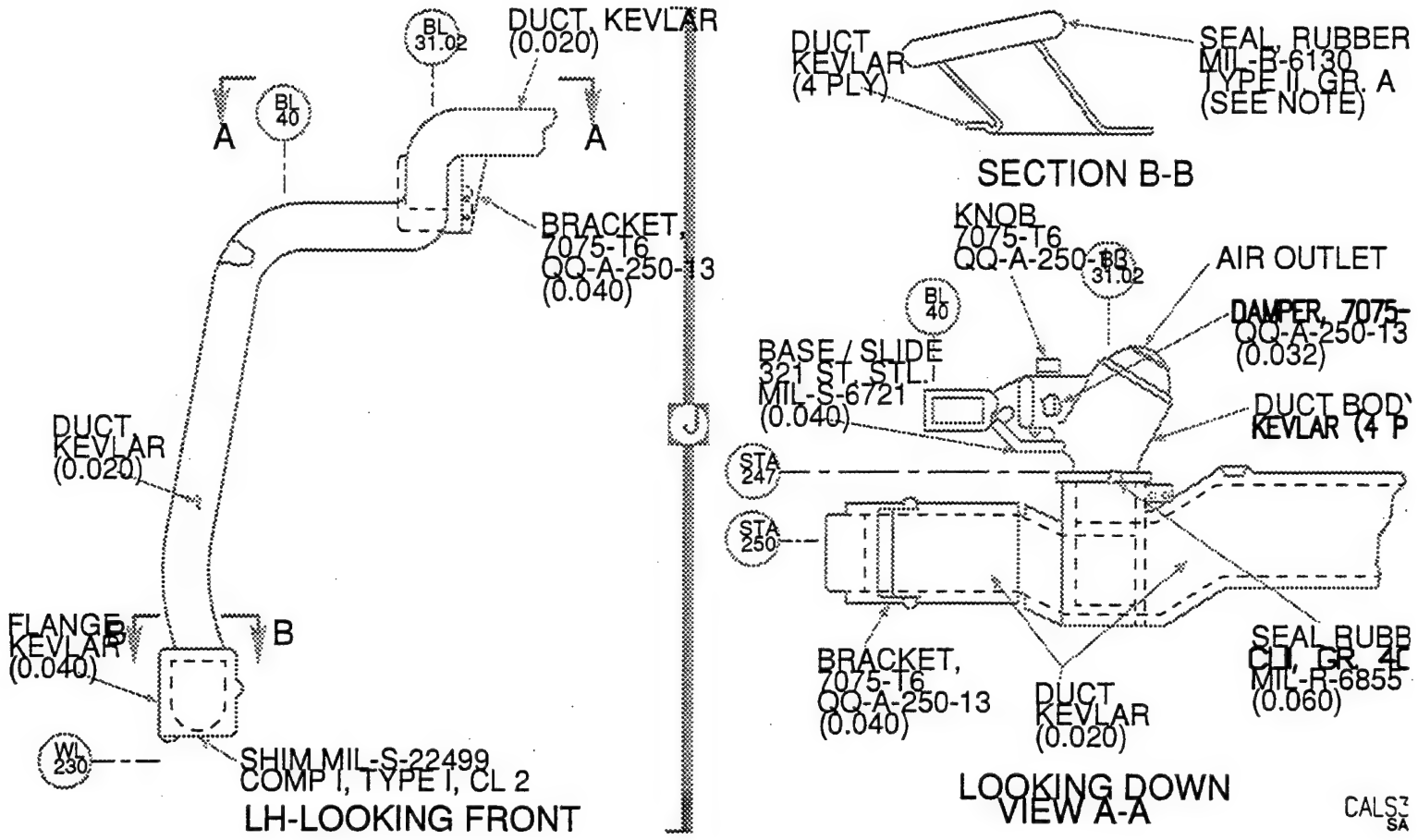
9.2.3 Designer 4.0 Log File

```
Computer Graphics Metafile from I:\94022\SIKTEST1.CGM
Import started on 03/23/1994 at 09:58

Input Translator Warning #103:
  Unrecognized data in input data stream.
Input Translator Warning #103:
  Unrecognized data in input data stream.
Input Translator Warning #103:
  Unrecognized data in input data stream.
Input Translator Warning #103:
  Unrecognized data in input data stream.

Computer Graphics Metafile from I:\94022\SIKTEST1.CGM
Import completed on 03/23/1994 at 09:58
```

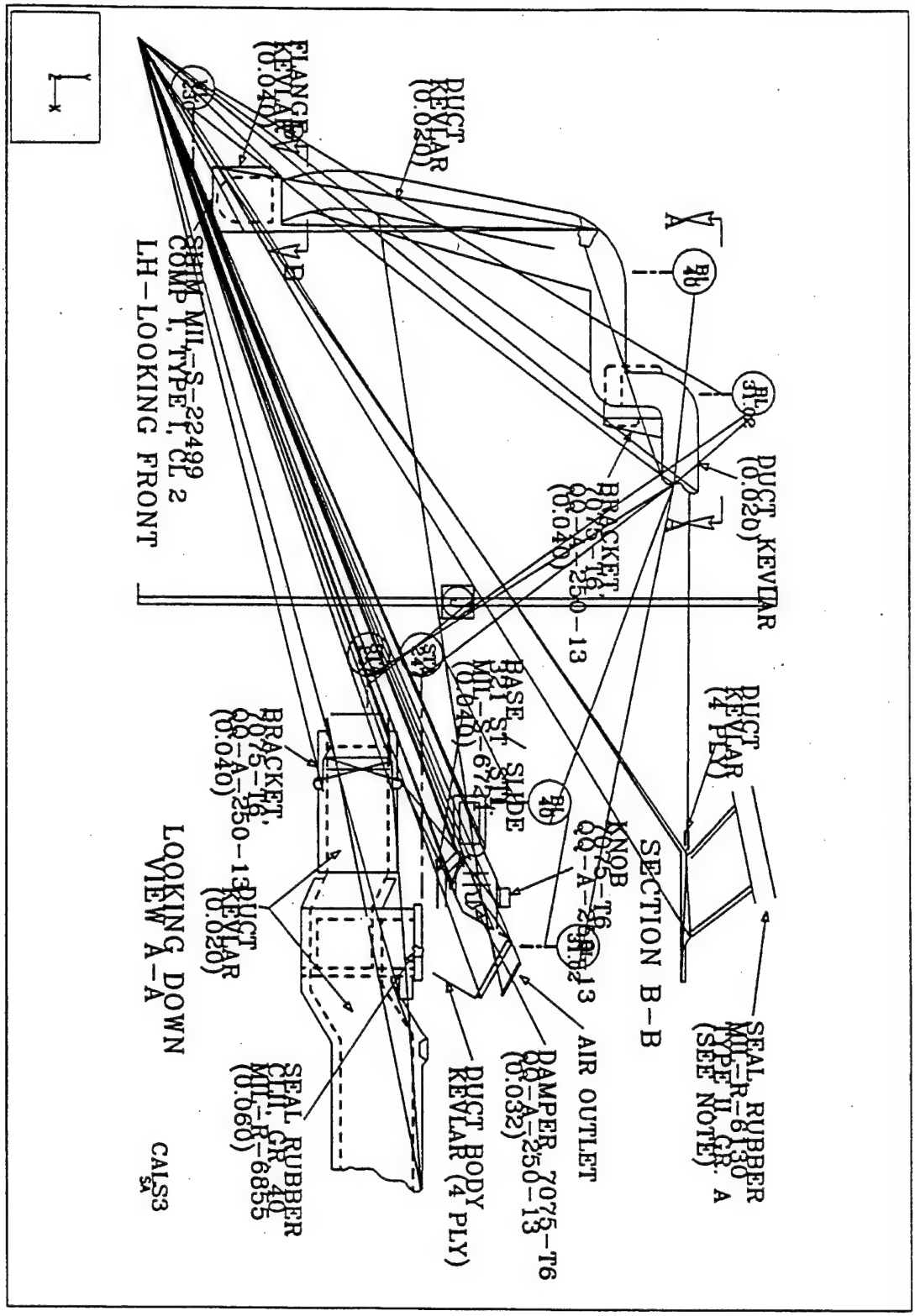
9.2.4 Output CADLeaf



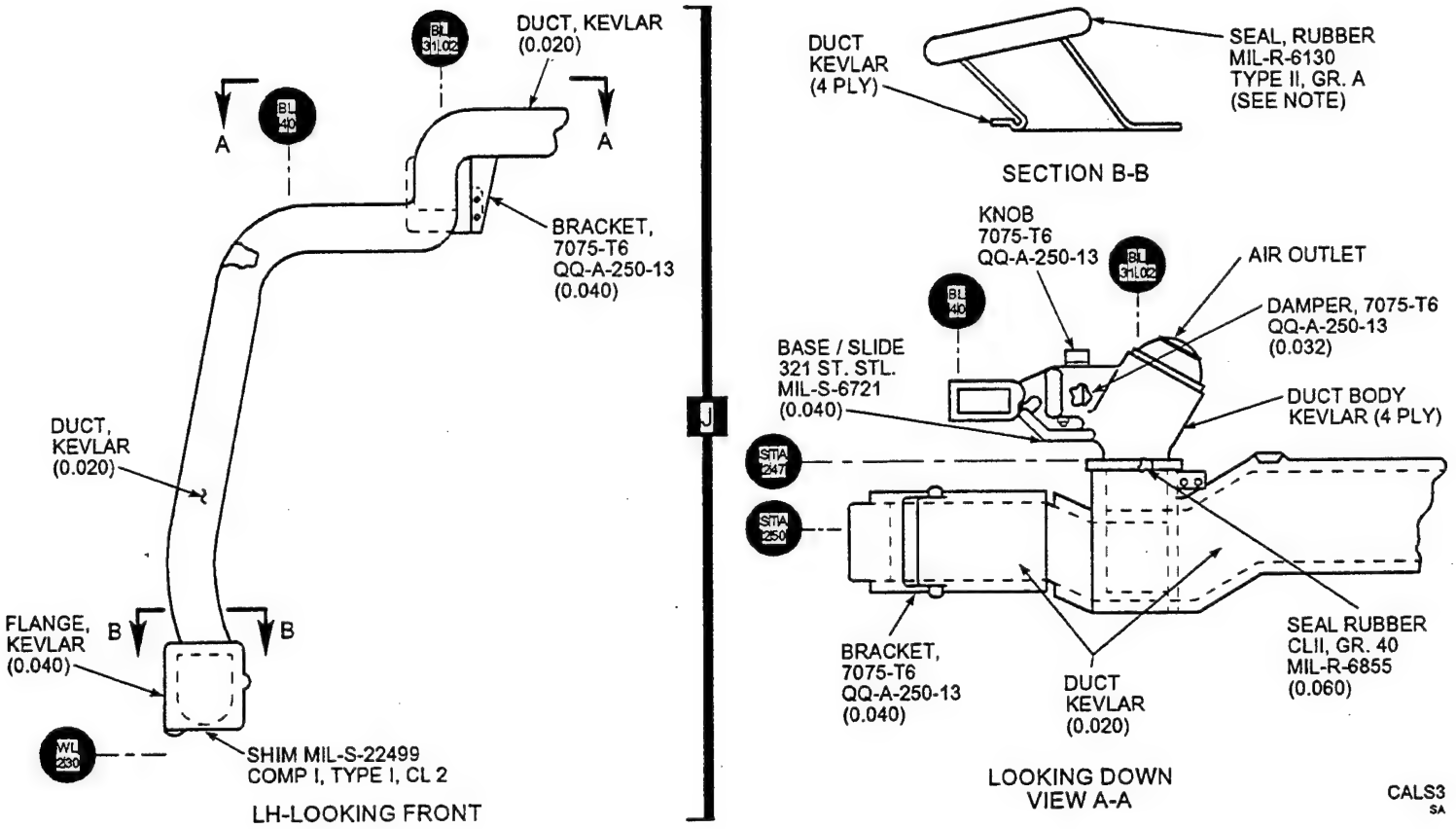
9.2.5 Output CALSView



9.2.6 Output Generic



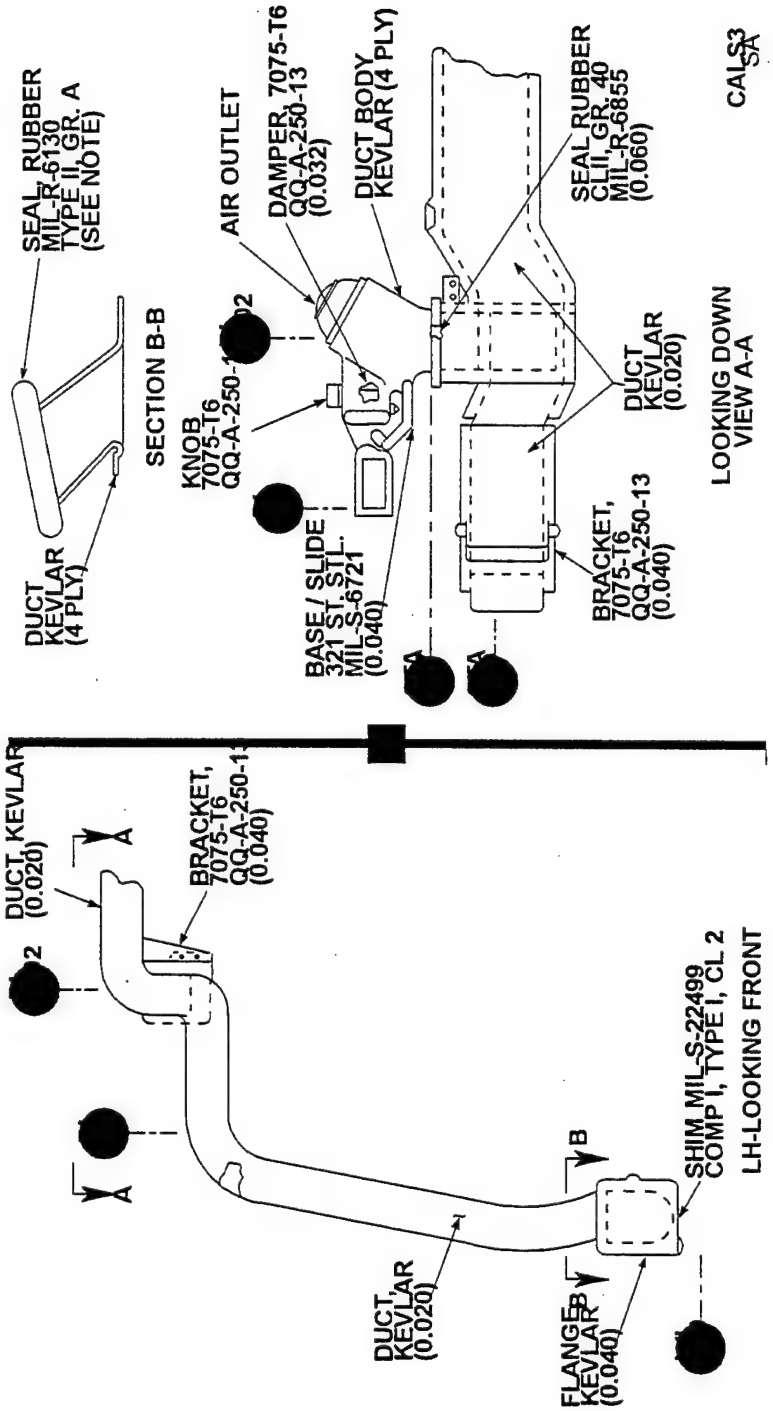
9.2.7 Output Designer



Designer

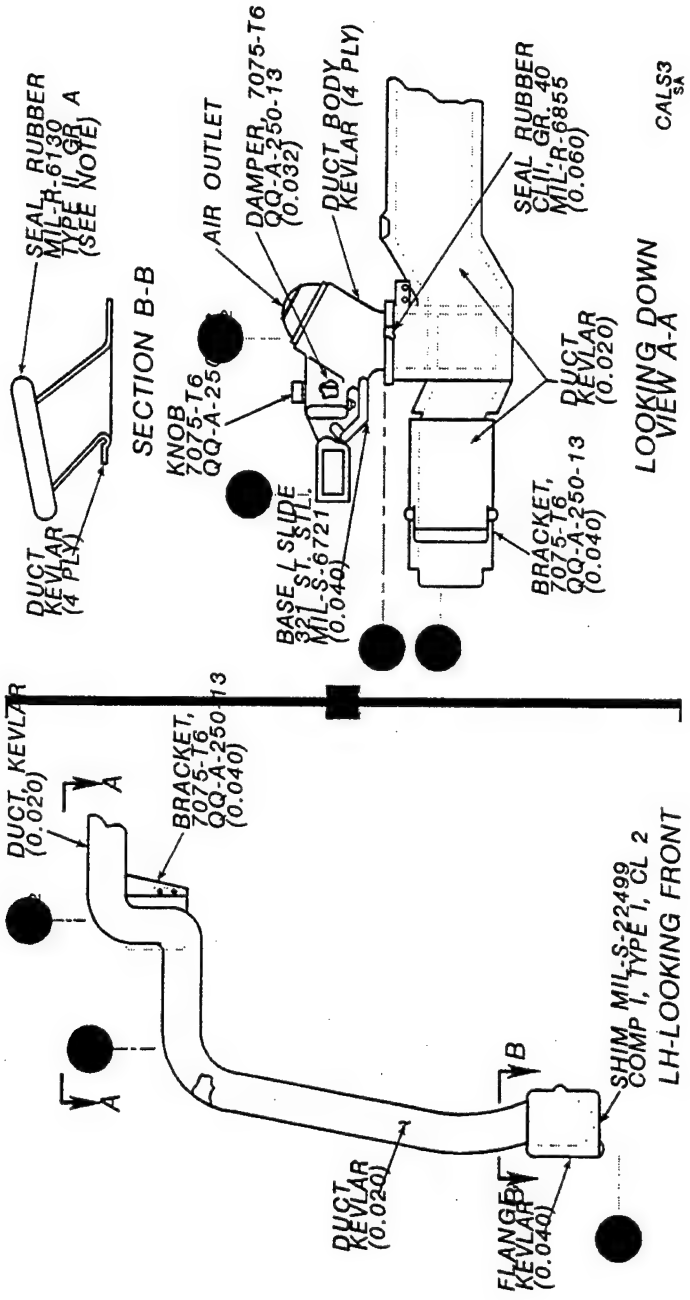
4.0

9.2.8 Output Freelance



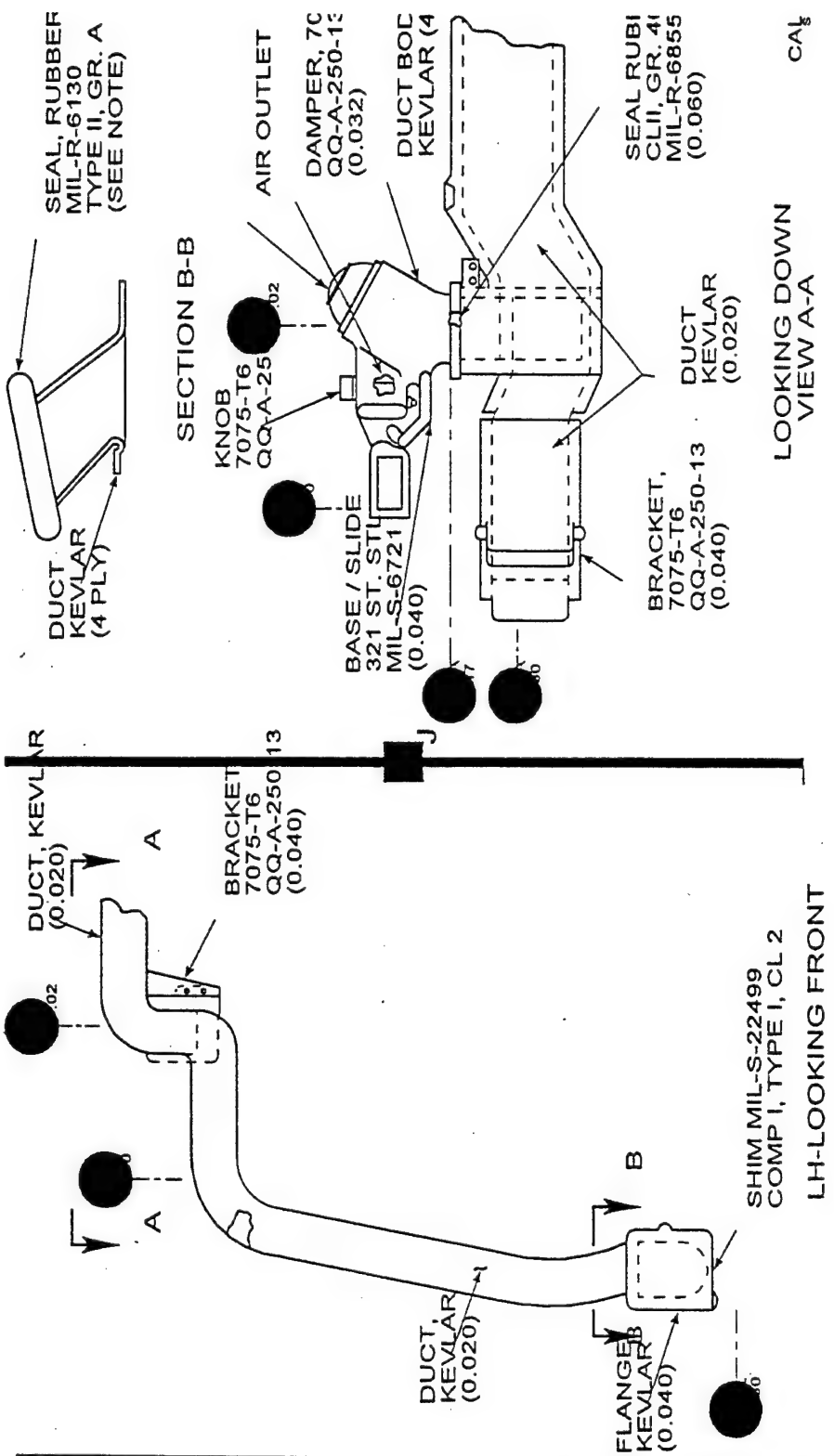
Freelance
SIK3

9.2.9 Output Harvard Graphics

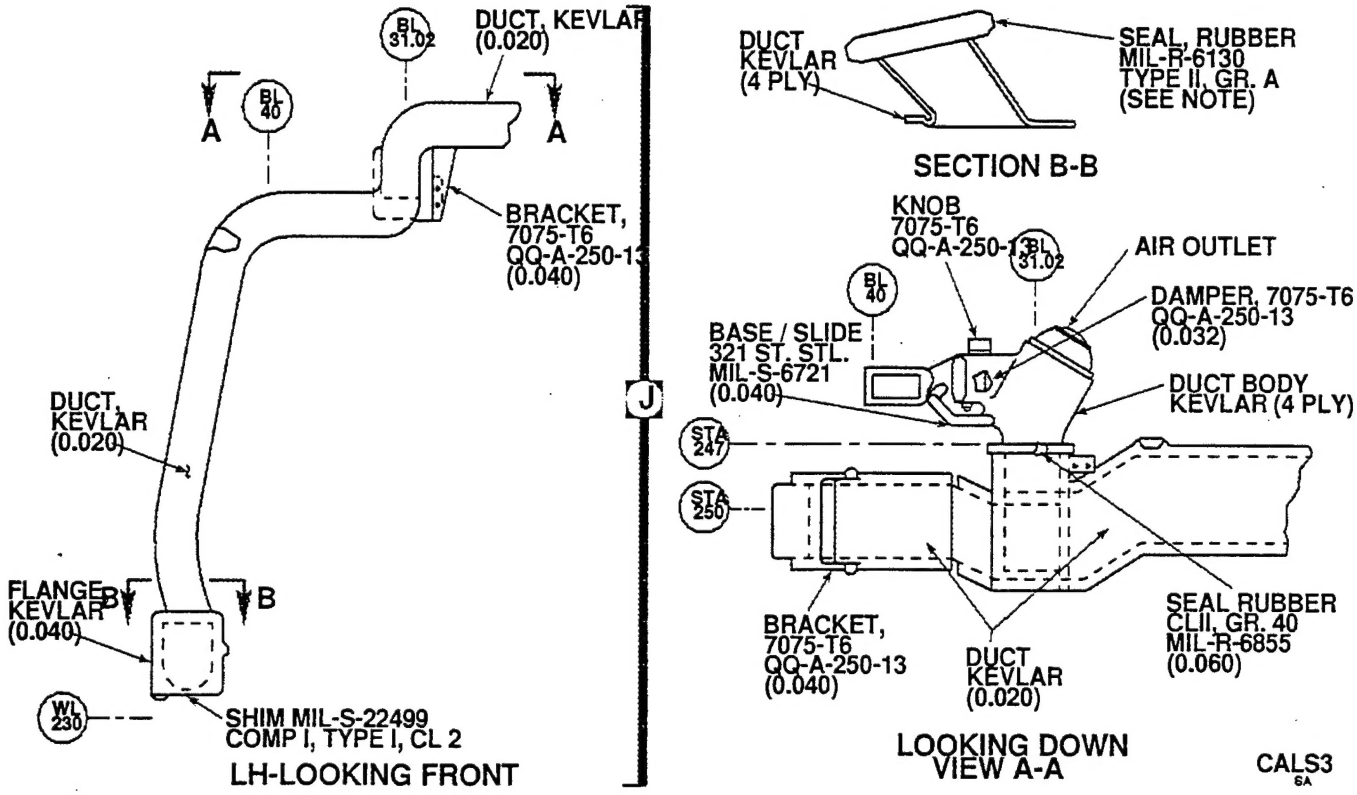


HG305
SIK3

9.2.10 Output HiJaak Pro

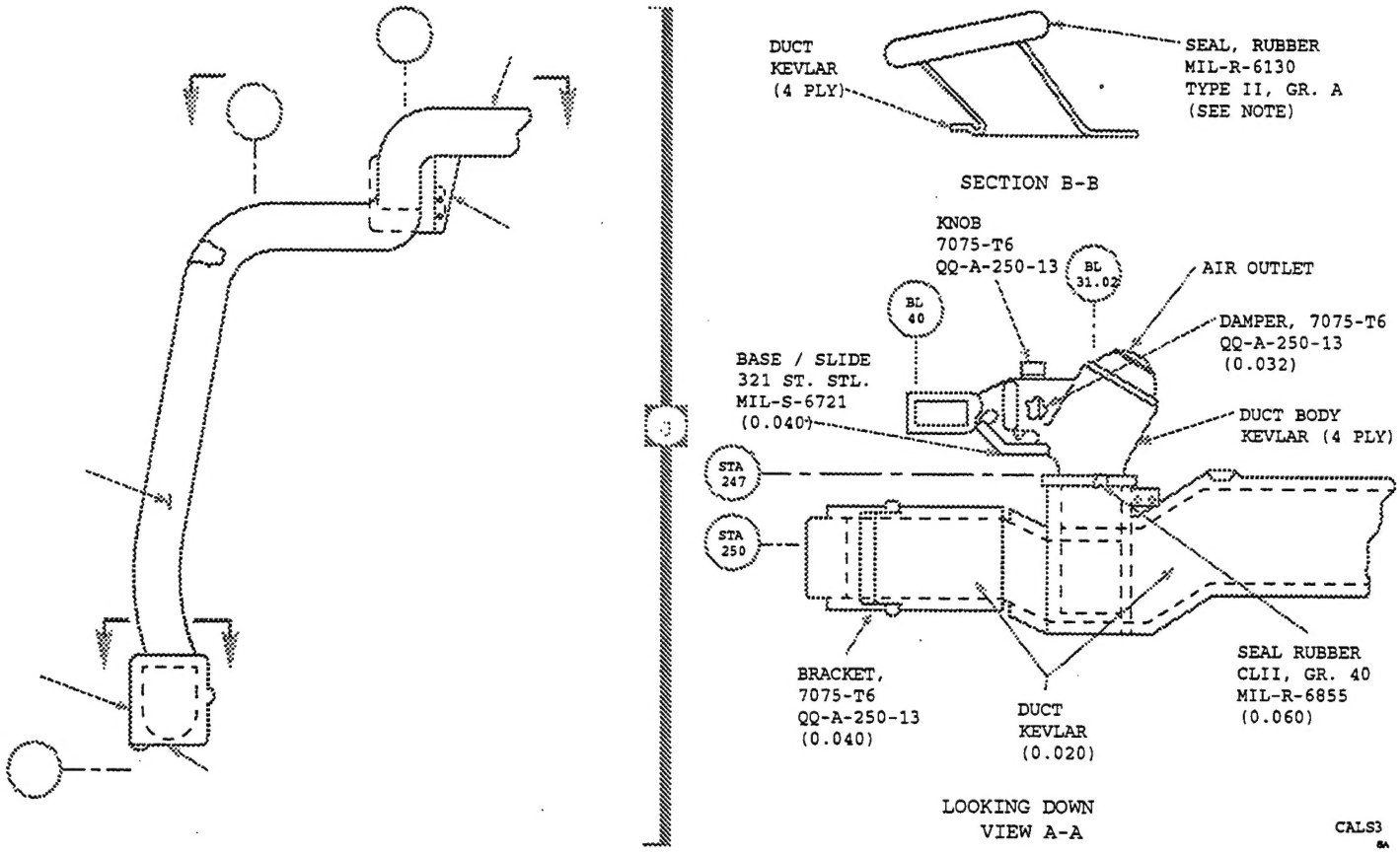


9.2.11 Output IslandDraw



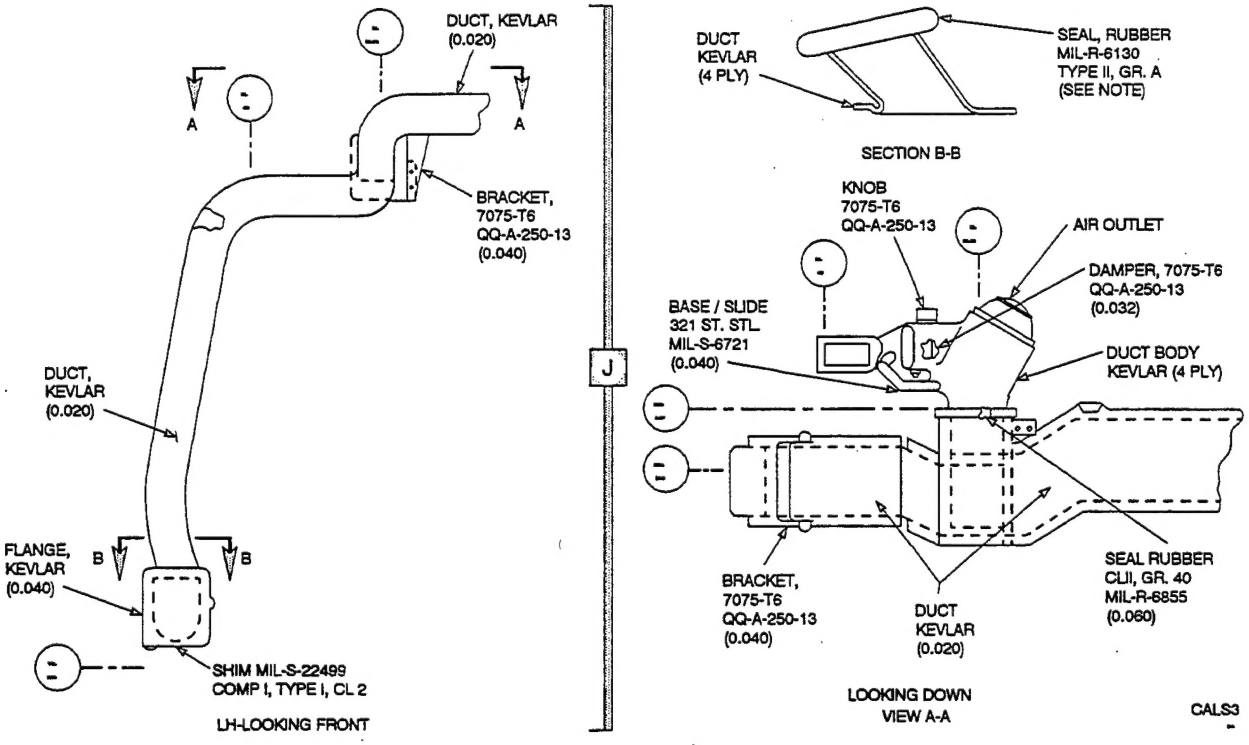
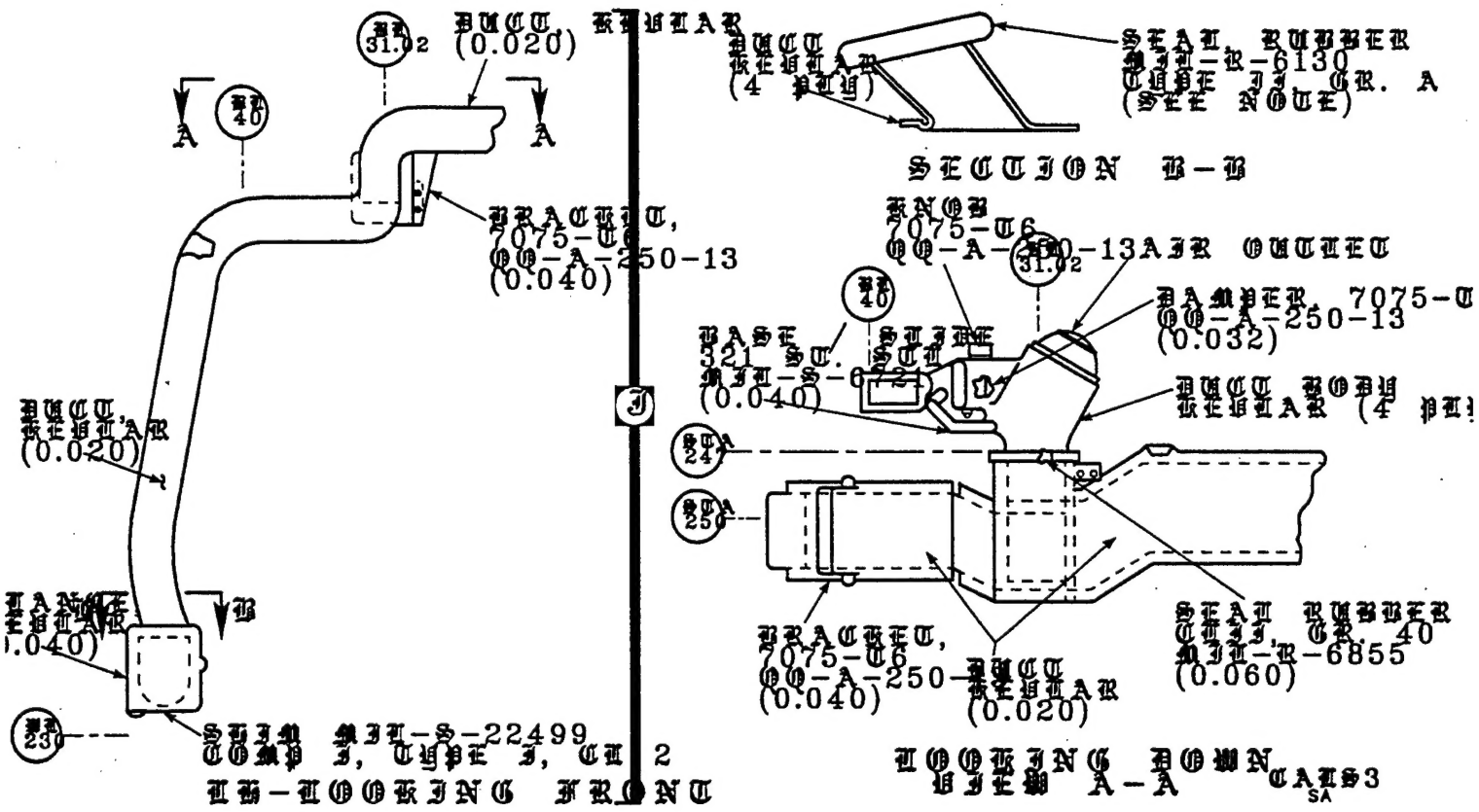
C2D/ID
SIK3

9.2.12 Output IslandDraw 4.0



ID4.0
SIK3

9.2.13 Output Ventura Publisher



9.2.14 Output X-Change